

CLAIMS

1. An optical scanner, comprising:
first and second reflecting optical elements,
5 wherein the second reflecting optical element is disposed so as to reflect incident light to be incident on the first reflecting optical element and reflected light from the first reflecting optical element.

2. The optical scanner according to claim 1, further comprising:
10 a light source part;
an optical deflector that scans a light beam from the light source part; and
a first image forming optical system that is disposed between the light source part and the optical deflector and allows a linear image to be
15 formed on a deflection surface of the optical deflector,
wherein the first reflecting optical element is formed of a curved surface mirror, and is disposed between the optical deflector and a surface to be scanned and constitutes a second image forming optical system, and
the first image forming optical system, the optical deflector, and the
20 second image forming optical system are disposed respectively in different positions in a sub-scanning direction so that a light beam from the first image forming optical system is incident obliquely relative to a plane that includes a normal line to the deflection surface of the optical deflector and is parallel to a main scanning direction, and so that a light beam from the
25 optical deflector is incident obliquely relative to a plane that includes a normal line at a vertex of the curved surface mirror and is parallel to the main scanning direction (hereinafter, referred to as a "YZ plane").

3. The optical scanner according to claim 1,
30 wherein the first reflecting optical element is formed of a curved surface mirror, and the curved surface mirror has a shape symmetrical with respect to a plane that includes a normal line at a vertex of the curved surface mirror and is perpendicular to a main scanning direction (hereinafter, referred to as an "XZ plane").

4. The optical scanner according to claim 1,
35 wherein the second reflecting optical element reflects the incident

light to be incident on the first reflecting optical element and the reflected light from the first reflecting optical element by using a common surface of the second reflecting optical element.

5. The optical scanner according to claim 4,

wherein the first reflecting optical element is formed of a curved surface mirror, and when a distance between the first reflecting optical element and the second reflecting optical element along a normal line at a vertex of the curved surface mirror is indicated as l , an angle formed by a center axis of the incident light to be incident on the first reflecting optical element and a plane that includes the normal line at the vertex of the curved surface mirror and is parallel to a main scanning direction as θM , a width of the incident light on the first reflecting optical element in a sub-scanning direction as dm , a width of the incident light to be incident on the first reflecting optical element on the second reflecting optical element in the sub-scanning direction as di , and a width of the reflected light from the first reflecting optical element on the second reflecting optical element in the sub-scanning direction as do , the following conditional expression (1) is satisfied:

$$\frac{dm}{2} + 1 \leq 2l \tan \theta M \leq \frac{di}{2} + \frac{do}{2} + 2 \quad \dots(1)$$

6. The optical scanner according to claim 4,

wherein the first reflecting optical element is formed of a curved surface mirror, and when a distance between the first reflecting optical element and the second reflecting optical element along a normal line at a vertex of the curved surface mirror is indicated as l , a distance between the first reflecting optical element and the second reflecting optical element along a center axis of the incident light to be incident on the first reflecting optical element as Lmi , a distance between the first reflecting optical element and the second reflecting optical element along a center axis of the reflected light from the first reflecting optical element as Lmo , an angle formed by the center axis of the incident light to be incident on the first reflecting optical element and a plane that includes the normal line at the vertex of the curved surface mirror and is parallel to a main scanning direction as θM , a width of the incident light on the first reflecting optical element in a sub-scanning direction as dm , a distance from a deflection

surface of an optical deflector to a vertex of the first reflecting optical element as L , and a distance from the vertex of the first reflecting optical element to a surface to be scanned as D , the following conditional expression (1) is satisfied:

$$\frac{dm}{2} + 1 \leq 2l \tan \theta M \leq \frac{di}{2} + \frac{do}{2} + 2 \quad \dots(1)$$

where di and do are approximated by the following expressions (2) and (3), respectively:

$$di = dm \times \frac{L - Lmi}{L} \quad \dots(2)$$

$$do = dm \times \frac{D - Lmo}{D} \quad \dots(3)$$

7. The optical scanner according to claim 1,
wherein the first reflecting optical element is disposed in a space interposed between incident light to be incident on the second reflecting optical element and reflected light from the second reflecting optical element.

8. The optical scanner according to claim 1, further comprising:
a third reflecting optical element that reflects reflected light from the second reflecting optical element,
wherein the first reflecting optical element is disposed in a space interposed among incident light to be incident on the second reflecting optical element, the reflected light from the second reflecting optical element, and reflected light from the third reflecting optical element.

9. The optical scanner according to claim 2,
wherein the first reflecting optical element has a shape that permits compensation for a curve of a scanning line that occurs due to oblique light incidence.

10. The optical scanner according to claim 2,
wherein the curved surface mirror has a skew shape in which a normal line at each of points other than the vertex on a generatrix that is a curved line where a surface of the curved surface mirror intersects with the YZ plane is not included in the YZ plane.

11. An image forming apparatus comprising an optical scanner as claimed in claim 1.